

### **REMARKS**

The Official Action mailed August 12, 2008 has been carefully considered. Claims 1, 3-13 and 15 are pending in the present application and stand rejected. Claims 1 and 12 have been amended. Reconsideration and allowance of the subject application, as amended, are respectfully requested.

#### **Claim Amendments**

Claims 1 and 12 have been amended to delete "dithiocarbamates". No new matter has been added by this amendment.

#### **Claim Rejections**

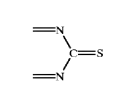
Claims 1, 5-13 and 15 stand rejected under 35 USC §103(a) as being unpatentable over WO 99142638/U.S. Patent No. 6,607,587 in view of Kucera et al U.S. Publication No. 2003/0075245.

It is respectfully asserted however, that the above references fail to render obvious the presently claimed invention as, once again, there is no reasonable expectation of success in the modification of Kanai by the disclosure of Kucera.

It is asserted in the *Office Action* of August 12, 2008 that "Kanai et al discloses that a compound having a thiocarbonyl group (I) is preferably one having a nitrogen or oxygen ion simultaneously as in Formula (II). Since the nitrogen or oxygen atom in such compounds also form a coordinated bond with a metal surface of zinc or aluminum, a thiocarbonyl compound, especially one having the both atoms simultaneously, readily undergoes the formation of a chelate bond on the zinc or aluminum whereby achieving a more firm absorption of the thiocarbonyl compound on the zinc surface (col. 3, line 55 to col. 4, line 13)." The *Office Action* then concludes stating "it would have been obvious to one of ordinary skill in the art that the nitrogen containing groups as disclosed by Kucera et al comprising thiourea, thiocarbamate and dithiocarbamate groups would have the same functions as desired by Kanai et al."

Considering the above with reference to the recited chemical structures, Applicants understand that the argument advanced is that since Kanai discloses a thiocarbonyl group ( $-C=S$ )

and since Kanai et al disclose that a thiocarbonyl group may have an associated nitrogen atom, such as in a thiourea, which according to Kanai has the following general structure:



the use of nitrogen contain groups in a thiourea, as taught by Kucera, would have been obvious.

A few comments.

The presently claimed subject matter does not involve the use of a carbon atom doubled bonded to a sulfur atom, nor does the presently claimed invention generally seek to protect the use of a nitrogen containing group to act in a thiocarbonyl. The present invention relies upon the use of carbon-sulfur compounds that utilize a carbon-sulfur single bond, which is completely different than the chelating functionalities in the cited references.

For the convenience of the Examiner, exemplary general structures of the compounds recited in claim 1 are illustrated below.

The general structure for alkyl thiol, aryl thiol, and alkyl-aryl thiol may be illustrated as follows:



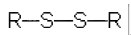
wherein R may be either an alkyl, aryl or an alkyl-aryl.

The general structure for sulfide may be illustrated as follows:



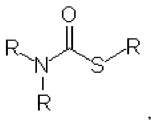
wherein R and R' may be, for example, hydrogen, an aryl or an alkyl.

The general structure for disulfide may be illustrated as follows:



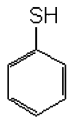
wherein R may be, for example, hydrogen, an aryl or an alkyl.

The general structure for thiocarbamate may be illustrated as follows:

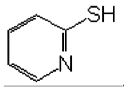


wherein R may be, for example, hydrogen, an aryl or an alkyl.

The general structure for thiophenol may be illustrated as follows:

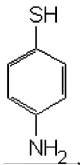


An example of a general structure for mercaptopyridine may be illustrated as follows:



it may be appreciated that in addition to 2-mercaptopyridine illustrated above, 4-mercaptopyridine, 6-mercaptopyridine, etc. may also be contemplated.

An example of mercaptoaniline may be illustrated as follows:

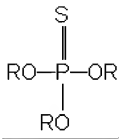


it may be appreciated that in addition to 4-mercaptoaniline illustrated above, 2-mercaptoaniline, etc. may also be contemplated.

An example of thiophene may be illustrated as follows:



An example of thiophosphate may be illustrated as follows:



it may be appreciated that in addition to the above, other O may be substituted by S atoms.

As can be seen, not one of these compounds relates to the use of a thiocarbonyl, as in the teachings of Kanai et al. In that regard, the chemical dissimilarity of a sulfur atom, in the context of its availability to chelate, is clearly not the same between a thiocarbonyl as discussed in Kanai and the compounds recited in claim 1. Quite simply, a thiocarbonyl ( $\text{-C=S}$ ) represents that situation where the electronic structure and availability of the unshared pair of electrons on the sulfur are different with respect chelating ability, and the art of record made it clear that it was considered necessary to have thiocarbonyl functionality ( $\text{-C=S}$ ) in order to chelate.

By contrast, the present invention recognizes and recites in claim 1 that thiocarbonyl functionality is not at all necessary as instructed by the prior art, and one can rely upon the non-thiocarbonyl compounds of claim 1 to provide increased corrosion resistance of a metallic substrate.

With the above in mind, Applicants again note the *Office Action's* comments at page 4 that the ground of rejection is based on the "functional equivalence of the nitrogen containing groups of Kucera at al." Hopefully, it is now clear that substitution of the compounds of Kucera based on the functional equivalence of the nitrogen containing groups is simply not enough. That is, the functionality of the thiocarbonyls taught as being necessary by Kanai would not be achieved if one was to substitute any of the compounds of Kucera based on the inclusion of nitrogen. More specifically, the principle reference of Kanai teaches that the nitrogen

compounds substituted must be conjugated as illustrated in formula II in order for the nitrogen group to form a coordinate bond with a metal surface as described in Col. 3, lines 51 through Col. 4, lines 13. Combining the references in the manner suggested would not provide compounds including conjugated nitrogen groups, nor would it render obvious the subject matter of claim 1.

Furthermore, with respect to the teachings of Kucera et al, it is important to note that with respect to his family of "modifying agent", appearing at paragraph [0069] of the published application, they are such that they must be used with a phenol, and must be reacted with the phenol, as recited at paragraph [0044] of Kucera et al. Again, the presently claimed subject matter recites compounds that are not reacted with a phenol, and on this basis, further distinguish over the art.

Claims 3-4 stand rejected under 35 USC §103(a) as being unpatentable over Kanai in view of Kucera and further in view of Thompson et al, U.S. Patent No. 4,684,507.

For the reasons recited above, it is respectfully asserted that claims 3-4 define over the art cited above.

Claims 1, 5-13 and 15 stand provisionally rejected on the group of nonstatutory obvious-type double patenting as being unpatentable over claims 1-17 of co-pending U.S. Application No. 10/786,379.

Once again, Applicants acknowledge the provisional rejection of the claims over claim 1-17 of co-pending U.S. Application No. 10/786,379 and will file a terminal disclaimer upon an indication of allowance of the applications.

Having dealt with all the objections raised by the Examiner, it is respectfully submitted that the present application, as amended, is in condition for allowance. Thus, early allowance is earnestly solicited.

If the Examiner desires personal contact for further disposition of this case, the Examiner is invited to call the undersigned Attorney at 603.668.6560.

AMENDMENT AFTER FINAL OFFICE ACTION

Serial Number: 10/786,340

Filing Date: February 25, 2004

Title: Method of Improving the Performance of Organic Coatings for Corrosion Resistance

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In the event there are any fees due, please charge them to our Deposit Account No. 50-2121.

Respectfully submitted,

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